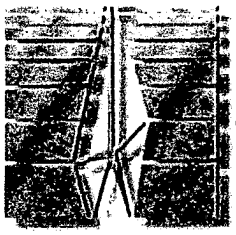

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Prof. V.M. Ustinov

16th December 2005

Declaration under Rule 132

I, Prof. Dr. V.M. Ustinov hereby declare as follows:

1. I am a Russian citizen residing at St.Petersburg and have a degree in physics from the Electrotechnical Institute, St.Petersburg, and a doctorate in physics from the A.F. Ioffe Physico-Technical Institute, St.Petersburg.

2. My special field is semiconductor physics and I have particular knowledge of Stranski-Krastanov growth.

3. I am the author or coauthor of at least 100 papers published in journals, such as Physical Review Letters or Journal of Applied Physics.

4. I have been asked to comment on what the person skilled in the art understands by Stranski-Krastanov growth, in particular with reference to Ge and Si semiconductors.

5. The term of "Stranski-Krastanov growth" applies to the formation of raised islands or accumulations of germanium (Ge) in a thin layer of Ge which is grown on a layer of silicon (Si). A thin layer of Ge in this case is to be understood as a layer of Ge having an average thickness of less than 1 nm, e.g. of 0.8 nm.

Since the lattice constant of Ge is greater than the lattice constant of Si by approximately 4 %, inherent stress is caused in a Ge layer grown on a Si layer by the lattice misfit between Ge and Si. This inherent stress results in the formation of a generally regular lateral arrangement of islands or accumulations of Ge material in the Ge layer. The islands have a relatively greater thickness than a thin region of Ge material, also known as the wetting layer, surrounding the islands.

Since Stranski-Krastanow growth is caused by inherent stress in the Ge layer as a result of lattice misfit of the Ge layer and the Si layer, the formation of a generally regular lateral arrangement of islands or accumulations of Ge material may be carried out without any additional photolithography or nanoimprint steps for the definition of the pattern in which islands or accumulations are to be grown. In other words, the island or accumulation growth is purely self-organized.

An example of a substantially regular lateral arrangement of islands or accumulations of Ge material in a plurality of Ge layers formed by Stranski-Krastanow growth in a Si/Ge superlattice is shown in Fig. 6 of the present US patent application no. 10/723,285.

As can be seen from Fig. 6, the side length of the Ge islands is in the range of 90 nm +/- 10 nm, i.e. the Ge islands have a relatively sharp size distribution. Further, the distance of the Ge islands is in the range of 150 nm +/- 10 nm, i.e. the Ge islands also have a relatively sharp distance distribution. In addition, the Ge islands are arranged in form of a rectangular lattice. Finally, the azimuthal orientation is the same for all of the Ge islands.

Hence, the Ge islands shown in Fig. 6 are arranged in a substantially regular pattern. In particular, the Ge islands are substantially regularly spaced apart.

It is noted that the Ge islands shown in Fig. 6 are definitely not randomly distributed. Randomly distributed Ge islands would show a Gaussian distribution regarding the size, the distance and the orientation of the Ge islands. However, no such Gaussian distributions can be observed in Fig. 6.

I, the undersigned, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States code, and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

St.Petersburg, 16th December 2005

Prof. U.M. Ustinov
Deputy Director